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**GREAT BARRIER REEF MARINE PARK AUTHORITY  
TECHNICAL MEMORANDUM GBRMPA - TM -23**

**MANAGEMENT OF RECREATIONAL FISHING IN THE GREAT BARRIER REEF  
MARINE PARK**

Wendy Craik

Great Barrier Reef Marine Park Authority,  
Townsville Qld 4810, Australia

November 1989

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*Since the compilation of this document, s. 35 of the  
Queensland Fishing Industry Organisation and Marketing Act  
has been revoked and therefore is no longer relevant to this  
Technical Memorandum.*

**KEYWORDS:** Great Barrier Reef Marine Park Authority, recreational fishing,  
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Please address comments or requests for additional copies to:

The Executive Officer  
Great Barrier Reef Marine Park Authority  
P.O. Box 1379 TOWNSVILLE QLD 4810 AUSTRALIA

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## SUMMARY

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There is an economically important, substantial and growing reef fish fishery in the Great Barrier Reef Region. Seventy to eighty per cent of the catch is taken by recreational fishermen, including some who dispose of their catch through commercial channels. Management of the fishery under Great Barrier Reef Marine Park legislation does not generally distinguish between commercial and recreational fishermen but operates on a "protected area and a few protected species" approach. Regulations under Queensland fisheries legislation include minimum size limits and some gear restrictions. With increased leisure and disposable incomes, recreational fishing effort is likely to increase (at a minimum of an estimated 7% a year) and catch is expected to almost double to about 12,000 tonnes p.a. by about 1990.

While there is no suggestion that the Great Barrier Reef is seriously overfished as a whole, there are some areas of local concern e.g. in a reduction in length of coral trout size at fished vs unfished reefs. Continued fishing effort is likely to enhance and increase such phenomena. There are also some conflicts between recreational and commercial fishermen as some 10% of "recreational" fishermen take some 30%-40% of the catch. In order to ensure the continuation of economic commercial, and enjoyable recreational fishing for the future, measures need to be considered to ensure equitable allocation of resources between these groups. Such an approach should enable more recreational and commercial fishermen to fish successfully.

Management options to be considered seem to require focusing on the recreational fishery. Options include making sales of fish illegal, educating recreational fishermen that fishing should be a non-profit recreation, limiting entry, closing areas, increasing lower size limits, imposing upper size limits, reducing the number of fishing trips, and/or, imposing bag limits. Because of the interest in bag limits as a potential management tool they are considered in a separate appendix. (Appendix 1)

Evidence, attitudes and experience of others and considerations in relation to these options for GBRMPA are considered in this paper. It is suggested that some of the options might be best adopted by fisheries agencies.

Available information suggests that supporting the closure of avenues for recreational fishermen to sell fish legally (and illegally) and education may be valuable starting points. Recent restrictions on sales of fish by amateurs are a positive step in this direction. Bag limits have been proposed in some areas and they may have some attraction in catch reduction if they can be enforced in the marine situation at an acceptable cost; their cost-effectiveness is almost impossible to determine and has not been formally evaluated elsewhere.

An overriding complication with any management measure such as size limits or seasonal closures is the paucity of information on the biology of these fishes and hence the effects of management measures, and in particular the effect of fishing on the size at which some species undergo a sex change.

It is concluded that formal evaluation of existing management measures, education to encourage "truly" recreational fishing and obtaining agreements on clear management objective are essential. More discussion and evaluation of the options are required before any decisions are made to impose new management measures; in particular the cost effectiveness and evaluation programs need to be assessed prior to the introduction of new measures.

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The Great Barrier Reef supports a substantial and growing recreational fishery, for both pelagic and demersal species. The Great Barrier Reef Marine Park Authority is concerned that with continued growth, the resource being targeted (including bait) is not adversely affected, that conflicts between recreational fishing activities and other activities are minimised, that reasonable fishing opportunities are provided and that above all the conservation of the Great Barrier Reef system is not compromised.

The Great Barrier Reef Marine Park is spatially divided into zones for which purposes for use and entry are specified. The zones are graded from General Use A Zone (covering most of the Park and in which most activities are allowed as of right), through increasing restriction to Preservation Zone (small areas in which only scientific research which cannot be undertaken anywhere else is permitted). The Great Barrier Reef Marine Park Act, under which zoning plans are drawn up, provides for regulation of all activities occurring within the Park.

Within the Great Barrier Reef Marine Park, there has, in general, been an attempt to give equivalent treatment to both recreational and commercial fishing. Line fishing is permitted in most areas of the Park as shown in Table 1, amounting to over 95% of the total Park area.

In addition to zones which regulate usage and which are specified for the life of the zoning plan, there are two kinds of temporary closures which can be introduced. These are the "Seasonal Closure" of a reef (for a matter of months) which can be for the purpose of protecting spawning stocks of fish, and "Replenishment" closure of a reef (for a matter of years) to all methods except trolling for pelagics, to enable resource stocks to regenerate.

## ECONOMIC IMPORTANCE OF RECREATIONAL FISHING

Recreational fishing in the Great Barrier Reef Marine Park is big business. While not directly comparable, the relative capital outlays indicate that the Great Barrier Reef Region recreational fishery (at least in 1979-80) had significant investment dimensions compared with the non-otter trawl commercial fishery:

	\$1979-80
Speedboat fleet (purchase price)	85 million
Charter boat fleet (market value)	33 million
Commercial fleet (market value) (non-otter trawl)	11 million

The recreational fishery is largely made up of line fishermen fishing for bottom and pelagic stocks. Other minor recreational fisheries include netting for bait and crabbing. The principal commercial fishery in the Great Barrier Reef is otter trawling for prawns and other crustaceans. The non-otter trawl commercial fisheries include line fishing for bottom and pelagic stocks, gill netting, crabbing, some netting and several more minor fisheries. Although there are management plans drawn up for the major commercial fisheries into which entry is limited and there is a limit on the number of Queensland commercial fishermen, all commercial fishermen can undertake line fishing.

Table 1: Great Barrier Reef Marine Park : Line Fishing

ZONE	HANDLINE FISHING	TROLLING
General Use A	/	/
General Use B	/	/
Marine National Park A	Gear Limitations	/
Marine National Park Buffer	X	For Pelagics
Marine National Park B	X	X
Scientific Research	X	X
Preservation	X	X
/ Permitted;	X	Not Permitted under Zoning Plans

Annual expenditure by recreational fishermen is also not insignificant (speedboats - \$19 million, charter boats \$10 million, non-otter trawl commercial vessels - \$5 million in 1979). For speedboats, this averaged out to about \$96 per trip: this is, of course discretionary expenditure.

The recreational reef fishery is growing significantly for both demersal fish and pelagic fish. New locations for small game fishing are being found on the Great Barrier Reef and this appears to offer considerable potential for expansion.

In 1979-80 130 charter vessels and some 15,000 speedboats out of a total Queensland fleet of 75,000 were estimated to fish in the Great Barrier Reef Region. The Queensland speedboat fleet has increased considerably and if it is assumed that equivalent percentages of speedboats fish the Great Barrier Reef, it is suggested that some 20,000 speedboats now fish in the Region each year. The number of charter vessels has doubled since 1980-81, although 60% of them do not promote fishing as a primary activity (Tor Hundloe, pers. comm.). Although the increase in charter vessels has largely been in the mass tourism non-fishing areas, there is still a significant component of the charter fleet which offers extended fishing trips to the Swain Reefs and Far Northern Section of the Great Barrier Reef Region. Fishing trips on charter vessels are often regarded as self financing with the fish being sold to cover the cost of the charter (although this practice may be illegal). Likewise some recreational fishermen using speedboats sell their catch to recover their investment in fuel, gear and the vessel.

Speedboat activity makes up the major component of recreational fishing. In 1979-80, the 15,000 speedboats fishing in the Great Barrier Reef Region made a total of 197,000 trips (average 13 per boat). The boats averaged 5m and carried 2.6 people per boat. Average fishing time was 6 hours, and average fishing effort was 9 hrs/km /year (Hundloe, 1985).

For comparison there are currently estimated to be approximately 150-200 full time commercial reef fishermen fishing in the Great Barrier Reef whose primary fishing occupation is reef fishing. There are also estimated to be some 100 commercial fishermen for whom reef fishing is a secondary fishery. No specific plan of management has yet been introduced to the Queensland reef fishery other than the overall limit on the number of commercial fishing licences. Discussions are currently in progress to introduce a plan of management for the fishery. The initial response to the plan was unfavourable and the proposals were deferred for further consideration (QCFO, 1986).



The fin fish catch in the Great Barrier Reef Region was in 1979-80 estimated to be in the vicinity of 10,000 tonnes, made up of 7,000 tonnes caught by recreational and non-master fishermen (6,500 tonnes from speedboats and about 500 tonnes from charter boats), and 3,000 tonnes caught by licensed Master Fishermen (Hundloe, 1985). Most of this volume of product is made up of reef fish. Consumer demand for reef fish results in a great, but unknown percentage of reef fish which are caught by "amateurs" entering the commercial marketplace. This is achieved, legally, under Queensland legislation which allows amateurs to sell fish under a purchased permit or through non-legal cash sales, barter or exchange. The size of the black market is unknown, but is believed to be considerable.

The distribution of the catch between recreational fishermen is uneven. The top 10% of fishermen take 30-40% of the catch; most fishermen catch less than 2 fish per person per trip. Precise numbers vary between areas, but the figures translate into 13 fish per person per day for the top 10% of Cairns speedboat fishermen and 33 fish per person per day for the top 10% of Capricornia charterboat fishermen (Craik, 1981; unpublished data).

With no significant restrictions on their operations, the recreational catch will continue to increase. If present catch rates are maintained, the catch will have almost doubled to 12,000 tonnes by 1990.

The potential problem with the Great Barrier Reef reef fishery is three-fold:

- on the best figures available the combined fishing effort of recreational fishermen is estimated to be increasing at a rate of about 7% a year. If the catch continues to increase at present rates, it will be about 12,000 tonnes by 1990.
- the total reef fish catch is continuing to increase, but there are signs of at least localized pressure, becoming evident.
- a small number of recreational fishermen are catching "commercial" quantities of fish without being subject to the restrictions applying to licensed commercial operators. Such operations cannot be described as truly "recreational". These operators and licensed commercial fishermen may legally fish in areas designated for "limited fishing" provided they do not contravene gear restrictions e.g., in the Marine National Park 'A' Zone. Accordingly they may take large quantities of fish, however because most such areas are heavily used by more orthodox recreational fishermen they are unlikely to be fished by licensed commercial or large scale recreational fishermen.

Already there may be some signs for concern about reef fish stocks:

- a decline in the mean size of reef fish caught from 2.6kg in 1961 to 1.4kg in 1985 off Townsville (Craik, unpublished data)
- the mean number of reef fish caught at reefs off Cairns is lower than that immediately north or south (Craik, unpublished data)
- the mean number of reef fish caught increases with increasing distance from shore off Cairns (Craik, 1979)
- the relatively smaller average size of coral trout at fished reefs in Capricornia compared with "closed" reefs (Ayling and Ayling, 1986)
- the relatively greater abundance of coral trout at reefs off Townsville reported to be subject to "low" fishing pressure compared with reefs subject to "high" fishing pressure (Ayling and Ayling, 1985)
- numbers of coral trout appear to increase with increasing distance from shore off Townsville (Ayling and Ayling, 1985).

Although the Great Barrier Reef Region is an extremely large area, and the problems are not yet acute, they will increase with continuing unrestrained increases in fishing effort. The small sizes of reef fish for sale in markets in Port Moresby, Tahiti and the Philippines indicate that heavy fishing can have a significant effect (personal observation). The commonness of sex reversal in reef fishes is an additional complication. If average fish sizes are being reduced by fishing, the fish population might fail to compensate by reducing the size at which the sex changes occur. It should however be pointed out

that a decrease in average fish size is not necessarily evidence of over fishing; average fish size decreases as soon as a virgin stock is fished.

Conflict between recreational and commercial fishermen is beginning to surface and this is reinforced by the absence of any restrictions on some amateur fishermen who in many respects fish commercially, as outlined above. These "pro-ams" are able to recover some of their costs or obtain a profit from what is portrayed as a recreational activity. Recent change to s35 of the Queensland Fishing Industry Organisation and Marketing Act are intended to restrict such sales.

It is also being recognised that management of recreational as well as commercial fishing may be desirable and in many cases, necessary (Starling, 1986) although the response of recreational fishermen to suggestions for management appears to depend on their fishing motivation.

A survey of island campers in the Capricornia Section of the Great Barrier Reef Marine Park indicated that there are two groups of campers; those who visit the islands to experience the natural attractions of the area and those who visit primarily to go reef fishing. The former group caught fish to eat and sometimes took a few kilograms of fish home with them; the second group used the island as a base from which to go fishing and had large freezers for storing fillets (Walker, 1986). Some campers expressed concern that fishing had deteriorated around the islands; others indicated it was as good as it always has been (Walker, 1986).

Surveys of recreational fishermen indicate that the motivation of living outdoors and experiencing natural environmental qualities, taking it easy, relaxation etc., are of considerable importance (Craik, unpublished data; Moeller & Engilken, 1972; Meyer, 1977) although catching fish was of moderate importance. In trout farms, however, where anglers paid \$US.1.50 per day (1983) to fish for up to 5 trout, catching at least 1 trout was as important as enjoyment of nature and relaxation (Hicks et al; 1983).

A number of attitudinal surveys on recreational fishing in Canada has indicated that number or size of fish caught is generally a less important consideration than lack of crowding (Bugan, 1974; Radford and Wiebe, 1975; Cox 1976; cited in Copes and Ketsch, 1986).

A recent investigation of the diversity of responses from recreational fishermen in their reasons for fishing and fishing experience preferences, showed that their responses varied systematically with the importance they placed on catching fish. Those who regarded the catching of fish as being of relatively low importance (low-consumptive) rated most other aspects of the fishing experience (e.g., relaxation, interacting with nature, escaping the daily routine) more important than high-consumptive fishermen. It seems obvious that actions that would limit catches would be likely to have a greater impact on high- consumptive oriented fishermen (Fedler and Ditton, 1986).

Hilborn (1985) reports that a contentious issue in the British Columbia salmon sports fishery was that of bag limits, the proposed levels for which would have affected only 5% of anglers. Sport fishing groups actively opposed these regulations and the reasons for this opposition appear to include the fact that the most active fishermen spend more time fishing and

have a higher stake in the fishery, and that the type of person who takes an active role in a fishing group is likely to be a frequent fisherman who associates with other frequent fishermen. "Thus the few fishermen who would be affected by small annual bag limits are the same people one expects to lead fishermen's lobby groups" (p.12).

Low levels of representation in lobby groups is also likely to be true in Australia; it is estimated that only 4% of recreational fishermen belong to organised fishing clubs (Aust. Rec. Fishing Confederation, 1984d cited in Gartside, n.d.).

An analysis of Madison River float anglers preferences for management strategies showed that different groups of anglers preferred different types of management strategies (Schoolmaster and Frazier, 1985), with experience being the single most important variable in this study. In terms of educational and interpretive programs, such information is particularly useful for determining which groups should be targeted with what information.

This diversity of responses to different management strategies was also found to be true for marine anglers in New York (Dawson and Wilkins, 1983). Charter and private boat anglers were questioned as to which form of potential regulation for marine recreational angling they preferred.

Responses were as follows:

Regulation	Charter Boats Favour or neutral	Private Boats Favour or neutral
Min size limit	70	90
Limited gear (2 lines)	56	69
Prohibition on amateur fish sales	55	62
Daily bag limit	50	61

Over 70% of both angler groups reported they would continue to fish as frequently as they had in the past if any of the regulations were imposed and the daily bag limit, the least favoured option, would have greatest potential impact on participation.

As Hilborn (p.11 1985) has pointed out, "The traditional nemesis of commercial fisheries, overcapitalisation and inefficiency, are valued aspects of a recreational fishery".

GBRMPA has generally not distinguished between recreational and commercial fishing, and in line with the zoning procedures specified in the Great Barrier Reef Marine Park Act has closed reefs to particular types or levels of fishing by all users.

Restrictions on fishing expressed through zoning plans are designed to ensure conservation of the Reef and equitable opportunities for all users. Different zone types are designed to provide differing degrees of environmental protection, which GBRMPA sees as its prime responsibility. In a recent survey of users of the Capricornia Section of the Great Barrier Reef Marine Park where restrictions have been in force since 1981, the majority of all user groups indicated that they believed the zoning plan had helped protect the reef.

On the question of opportunities provided for recreational line fishing in the zoning plan, the vast majority of respondents of all user groups indicated that they felt the level of fishing opportunities provided was about right. Most groups were divided about whether there should be fewer opportunities provided for commercial fishing (Environment Science and Services, 1986).

The zoning approach to ensuring conservation of fishing opportunities is based in part on the philosophy that closed areas will enable a part of the resource to be undisturbed by fishing, providing a reference area, and potentially an enhanced supply of eggs and/or larvae, and/or juveniles and/or adults for the parent, and other reefs. The extent to which this strategy is successful for reef fish in Capricornia is under investigation, and there is a major research effort being directed at assessing the effect of closing and reopening one of the "Replenishment Area" reefs.

Preliminary indications from the data already available suggest that reefs where fishing has not occurred or effort has been lower may have somewhat more and/or somewhat larger fish, than reefs heavily fished. However, for reefs examined in the Great Barrier Reef the effects are not as striking as may have been expected from results in the Philippines (Russ, 1984), or from early surveys in Capricornia (Craik, 1981b).

It has been suggested that a negative effect of zoning is to increase effort on "open" reefs.

Assessment of the likely effect of management measures is complicated by our relatively poor knowledge of the population dynamics of reef fish.

Remarkably little is known about the precise life history details of Great Barrier Reef fishes of recreational and commercial importance. Among other things, it is known that many reef fishes change sex (e.g., Goeden, 1978), that they do not appear to be very mobile (although a small percentage of tagged

coral trout have been recaptured 30-40km away from their tagging reef; Craik and Mercer, unpublished data), that there are what appear to be natural variations in cross-shelf and north-south distribution of coral trout (Ayling and Ayling 1985, 1986), that annual coral trout recruitment may be large (up to 30% of the population), that early growth is rapid and that mortality in early years appears to be fairly high (Ayling, pers. comm.).

We do not know

- whether eggs and larvae spawned at one reef generally remain at the parent reef or end up at another reef, and whether this varies between reefs
- whether reef fish are stationary over long periods of time
- the longevity of many species
- whether the size at which reef fish change sex is reduced as the average size of fish in the population is reduced, or whether it remains steady
- whether GBR reef fish make spawning aggregations as do the same species in other coral reef areas
- whether there is a critical spawning population size
- rates of natural mortality.

In other words, there is still a lot of basic information on life history matters to be collected.

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**MANAGEMENT OBJECTIVES**

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The primary objective in relation to the reef fishery is to be sure that there continues to be sufficient table fish available to enable

- i a viable commercial fishery to be sustained
- ii recreational fishermen to be able to catch one or two fishes if they wish without great difficulty
- iii recreational divers to be able to see reasonable number and variety of fish when diving.
- iv some areas to be set aside to provide unfished "reference areas".

Objective iv can be (and is being) achieved through zoning in which some areas are zoned so that no fishing is allowed. It is assumed that such unfished areas will provide spin-off benefits to other fished reefs and thereby contribute to objectives i, ii and iii. The achievement of the first objective may be related to the total size of the recreational catch. The achievement of objectives ii and iii is partially related to the total size of the recreational catch vis a vis the commercial catch, but it is primarily related to matters of allocation of the catch.

A strategy therefore for assisting in achieving such objectives is to limit, in some way, the individual catches of recreational fishermen to several fishes per person per trip or day. As there is little evidence regarding the population dynamics or biological status of the reef fish stocks, management strategies based on assumed biology and population dynamics may be unsuccessful and/or counter-productive.

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**MANAGEMENT MEASURES**

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In considering the options available for management, the objectives must first be agreed and the range of possible options considered. The options seem to fall into 3 categories.

- i take no action additional to measures being implemented in zoning plans and through fisheries agencies.
- ii take some indirect action to encourage and discourage specific behaviour e.g. charge a fee for recreational fishing, limit the size of iceboxes in speedboats.
- iii reduce catch and/or effort in some way of recreational fishermen.

Measures available under the third options are canvassed in some detail later in the paper. The "take no action" option however, requires consideration as it may be the most cost-effective.



As there appears to be increasing fishing pressure and as recreational fishermen appear to take the majority of the catch, there appears to be a need to contain the recreational reef fish catch. Ways in which this might be achieved include:

- i) making sales of fish by amateurs illegal and enforcing such a provision.
- ii) educating park users that recreational fishing is exactly that
- iii) limited entry fisheries, e.g. resident and non-resident recreational fishermen are treated differently
- iv) closing some reefs to recreational fishermen
- v) increasing the lower size limit of fish retained
- vi) imposing an upper limit on size of fish of some species retained
- vii) reducing the number of trips
- viii) use of barbless hooks
- ix) introducing a bag limit on reef fish.

Detailed comments on the options above follow, but because of current interest, bag limits are considered in greatest detail.

- i) Making sales of fish by amateurs illegal

Recently changes to Queensland legislation resulted in restricting sales of fish by amateurs to 50kg per permit and an amateur is restricted to 12 permits a year.

Complete prosecution of this approach may well have the desired effect of reducing the "recreational" catch. If the provision cannot be enforced, taxes on landings may have a similar effect; however, the enforcement problems are comparable. Options related to sales of fish are beyond GBRMPA control. In 1988, s.35 of the Fishing Industry Organisation and Marketing Act was amended to limit sales of fish by amateurs to 50kg (whole, headed and gutted only) per permit and permits were limited to 12 per year per person.

Arguments and factors for and against sales of fish by amateurs are as follows:

In favour

Removes "commercial" aspect from recreational activity.

May reduce "recreational" catch to lower levels.

May give commercial fishermen more scope to diversify.

Queensland Sports and Recreational Fishing Council, Queensland Commercial Fishermen's Organisation appear to support this approach.

QFMA have tightened up s.35 which allow amateurs to sell surplus catch.

Against

Number of landing and sale points high i.e. logistic difficulties.

Education program preferable.

Current numbers of commercial fishermen may not be able to fill the gap in the market left by the removal of "recreational" fishing.

ii) Educating park users

This appears to be a desirable option which should be pursued whether or not regulations are introduced. Voluntary acceptance of a style of behaviour will - in the long term - be more successful than regulation. Regulations may act as educative tools in themselves e.g.. a regulated bag limit could reduce the current "target" of amateur fishermen. Comparisons of recreational reef fishing costs with other expensive non-profit recreations are needed (e.g. marlin fishing, skiing). This option is within GBRMPA's powers.

iii) Limited entry fisheries

This option, which would discriminate in some way between types of recreational fishermen, appears to be largely impractical, for enforcement, logistic and political reasons. Any logical basis for restricting entry is not obvious.

iv) Closing some reefs to recreational fishermen only.

Zoning plans currently in force do not discriminate against recreational fishermen - line fishing closures also apply to commercial fishermen. However, the reverse (closing reefs to commercial fishermen) was implemented in the Capricornia Section Zoning Plan.

This option is within GBRMPA's capabilities and has been suggested by commercial fishermen e.g. for the Hardline Reef complex. It would be most unpopular with recreational fishermen.

- v) Increasing the lower size limit of fish retained, and
- vi) Imposing an upper limit on size of fish of some species retained.

Options (v) and (vi) relating to size limits may improve the reproductive capacity of species (and therefore possibly recruitment to the fishery) and are again within GBRMPA capabilities. The complications that sex changes add to reef fisheries management mean that each species would need individual consideration and such sizes may well be different. An increase in minimum size limit above the minimum sex change size for some species would seem desirable.

- vii) Reducing the number of trips.

This option would reduce total catch if fishing habits did not alter. Means of achieving this are hard to determine.

- viii) Use of barbless hooks.

This option perhaps in conjunction with size limits may reduce the mortality of released fish and put more "sport" back into fishing. Its acceptability may be doubtful, and it prevents management problems.

- ix) Introducing a bag limit on reef fish.

This option could be the basis for a considerable reduction in the recreational reef fish catch, while inconveniencing a minimal number of anglers. Logistic difficulties are, however, great.

Bag limits are considered in detail in Appendix 1.

While bag limits are conceptually attractive there seems to be potentially enormous problems in their implementation. In spite of their conceptual attractiveness, like many fisheries management measures, their effectiveness in the marine environment does not appear to have been demonstrated. Any proposed introduction of bag limits should be preceded by a clear statement of how bag limits relate to the management objective and how their effectiveness will be evaluated.

Management of the reef fishery is currently proceeding through a number of regulations on minimum size and amateur sales of fish under Queensland legislation and zoning plans under Great Barrier Reef Marine Park zoning plans involving closed areas.

Before new measures are introduced, it is necessary that there be

- . a clear statement of management objectives
- . consideration of possible options to achieve those objectives
- . evaluation of the options
- . design of a program to evaluate the chosen option.

At this stage, introduction of additional biological management measures seems premature; until more information is available on the history of reef fish, prosecution of an evaluated clearly gazetted and formulated education program seems the most cost-effective option to consider.

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11      **ACKNOWLEDGEMENTS**


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**APPENDIX I      REVIEW OF BAG LIMITS**


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In the Capricornia Section, 76% of campers surveyed by Walker (1986) supported bag limits; 20% of those surveyed were opposed to bag limits on campers. Some campers believed bag limits would be inequitable if not also applied to commercial fishermen and to fishermen based on boats. E.S. & S. (1986) reported similar findings. Of 10 Capricornia Section user groups surveyed on this topic,<sup>1</sup> over 65% of respondents in each group surveyed, except charter boat operators (50%) passengers (45%) and private motor boat owners (30%), thought there should be a bag limit on recreational line fishing. A similar but higher pattern of response applied to the same question in relation to recreational spearfishing where over 70% of each group supported a bag limit. The spearfishing group was not surveyed as a distinct group.

These findings appear to suggest something of a change of attitude; in 1979-80 when the first draft zoning plan for Capricornia was published, a proposal to include a mechanism for the introduction of a bag limit met with a mixed response, but was generally not favoured by recreational anglers.

Copes (1986) has summarised the problems which can occur with individual catch quotas in commercial fishing and many of the points are also applicable to recreational fisheries:

The problems to be identified are:

- quota busting (individuals will inevitably exceed the catch limit; enforcement levels, cultural and social pressure, penalties and gain from cheating will determine the degree of non-compliance).
- data fouling (under reporting of catches and poor quality data are two effects which have been reported for fisheries with individual quotas).
- residual catch management (if for example a reproductive target is established the catch is residual, and setting a quota for the catch may be patently absurd).

- 
1. commercial fishermen, private motor boat users, charter boat operators, permit holders, island residents, Heron Island and Lady Elliott resort visitors, charter boat passengers, island campers and user clubs and organisations.

- . Unstable stocks (if the total catch cannot be accurately determined at the beginning of each season e.g.. in a shortlived species with high year class variability) determining individual quantities will be hazardous.
- . flash fisheries (e.g.. where the fish need to be caught in a very short period of time to catch them in a particular condition, the fish will not wait for inefficient fishermen to fill their quotas.
- . real time management (if necessary for precise timing of stock exploitation, individual quotas are unlikely to be suitable).
- . high grading (discarding fish of lesser quality, which are likely to be unreported and will affect estimates of fishing mortality.
- . multi-species fisheries (separate sets of quotas are required but this may lead to "accidental" targeting of high value species, or an overall quota may result in high grading.
- . seasonal variations (if stocks fluctuate seasonally, fishing is likely to be concentrated).
- . spatial distribution of effort (if stocks are not uniformly distributed, fishing is likely to be concentrated; intra marginal grounds are inevitably over exploited.
- . TAC setting (the TAC may not always be met because of lack of time or opportunity by fishermen to transfer unfilled quotas)
- . industry acceptance (fixed quotas diminish the opportunity for fishermen to benefit from a luck big catch).

Copes (pers comm.) suggests that bag limits may have a relatively better prospect in recreational fishing than individual quotas in commercial fishing but he points out there is no perfect system and which imperfect system is best in any instance depends on the particular circumstances for fishery.

Arguments for and against bag limits are legion. A summary is provided below:

#### In favour of bag limits

Reduction in catch by amateurs, not likely to occur by education alone.

Affects very small percent of recreational fishermen.

#### Counter Argument

Discriminatory

Will remove element of competition for club outings and will probably destroy current style of operations. ANSA removed the straight "numbers game" competition years ago.

Legislatively reinforces notion of "recreational fishing" being desirable behaviour.

Amateurs won't be able to cover cost of outings and gear.

### Against bag limits

### Counter Argument

Difficult to enforce (many launching points). Regulations which are impossible to enforce are questionable.

Successful prosecution may overcome initial failure to abide by bag limits.

How to distinguish the number of fish from fillets only.

Insist on landing whole fish or kilogram equivalent and/or retain.

The bag limit becomes a target in itself.

Education may counter.

Anglers take additional passengers on board to maximise catch.

Passengers will not always be available.

Fish caught initially are replaced by more desirable fish caught later in the trip.

Returned (dead?) fish still in ecosystem.

Economic incentive to cheat.

Most people are law abiding.

Will adversely affect charter boat industry.

60% of charterboat operators now do not provide fishing as primary activity. Charter boat numbers have doubled in 5 years.

Doubtful capacity of licensed Master Fishermen to fill the gap immediately.

Acceptance and effect likely to be gradual.

### Existing bag limits in force

Bag limits are a relatively little used mechanism in Australia for reducing amateur catch. Table 2 indicates the extent to which bag limits are used in Australian States to regulate recreational fishing.

Table 2: Bag limits in force for recreational fishing by State (Modified from Winstanley, 1985)

Fishery	W.A.	S.A.	Vic	Tas	NSW	Qld	N.T.
Australian bass					10	20	
Australian salmon	5						
(blue, brown or red)	1				2		
King George whiting		30					
Red Morwong					5		
Abalone		5	10	10	15		
greenlip and							
brownlip	10						
Roe's	20						
Blue Crabs	36	36					
Prawns	9 litres						
Scallops			100	200			
Southern Rock							
Lobsters - by							
diving	8	5	4	5	5		
by pot or hoopnet	8	no limit	4	10	5		
Squid			10				
Reef Fishes combined							
(includes snapper)	10						
Barramundi							5
Spanner Crabs							5

As is evident, most bag limits apply to individual species. The W.A. bag limit for "reef fish" is the exception, where there is a bag limit of 10 reef fish per angler day made up of Australian jewfish, northwest snapper, blue groper, salmon fish, spanish mackerel and blue morwong.

Overseas bag limits in recreational fisheries are not unusual and they apply mainly to individual species and comprise a daily maximum limit and a maximum possession limit (equal to or almost double the daily maximum limit).

#### Evaluating the effectiveness of bag limits

It is difficult to evaluate the effectiveness of bag limits because of the paucity of knowledge of, for example recruitment and natural mortality, which could mask or generate results which might otherwise be ascribed to the imposition of limits (Kirkegaard, pers comm).

Estimates of compliance with fisheries regulations are difficult to obtain; and seem to be infrequently obtained. Compliance with a minimum size limit regulation on freshwater fish in Iowa streams was estimated as 86% (Paragamian n.d.).



The only known published evaluations of bag limits are those by Bargmann (1984, 1985) who investigated the "appropriateness" of existing limits for groundfish in Puget Sound, Washington. Bag limits had been in effect since 1961 and the analysis was undertaken in 1981 when the following limits were in effect:

- Pacific cod, walleye pollock, greenling, rockfish: 15 fish per day and no more than 10 rockfish
- lingcod: 2 fish per day in part of the area between 15 April and 30 November: otherwise lingcod fishery closed
- Pacific halibut: 2 fish per day from 1 March - 1 October
- no restriction on other ground fish species.

Anglers were classified into those targeting on particular species and those who were not targeting. Of those targeting on species, success rates were much higher. The majority of anglers surveyed did not appear to approach the bag limits however there were a few exceptions where limit catches were obtained e.g.. 67% of targeted lingcod trips in some areas attained the limit. For an estimated total of 311,000 angler trips, it was concluded that bag limits were effective in limiting the lingcod, walleye pollock and Pacific cod harvests in some areas and the rockfish harvest by targeting anglers. Based on the catch data for 1981 Bargmann calculated the following:

All species	Bag limit/day	% reduction in catch
	15	1
	10	8
"Aggregate" species	10	10
Rockfish	5	9
Walleye pollock	10	15
Pacific Cod	10	4
Lingcod	1	20
Greening	2	4
Flatfish	10	3
	7	12

Subsequently, in 1983, the daily rockfish bag limit was decreased to 5 fish in some areas of Puget Sound, based on an anticipated 9% reduction in total catch. Anglers were surveyed in the summer of 1983 to evaluate the impact of the bag limit changes and awareness of the regulations by anglers (Bargmann, 1984). Knowledge of the restrictions was as follows:

Year Limit imposed	No. of rockfish identified as limit	Percent of Responses in 1983	
		All anglers	Rockfish anglers
1983	5	15	25
1978	10	3	3
pre 1978	15	10	12
	Don't Know	59	40

The limit reduction had little effect on the number of angling trips made by the anglers interviewed (98% of all anglers interviewed stated that the number of bottom fish angling trips they made had not changed because of the bag limit). Ten percent of all anglers and 20% of rockfish anglers caught a rockfish limit in 1983 and 5% and 11% of each of these groups respectively, had released rockfish they otherwise would have kept because of the reduced limit. Thus the number of angling trips appeared generally unaffected but the number of rockfish retained appeared to be reduced by some small unquantified amount.

In British Columbia the bag limit in the Strait of Georgia of 2 salmon per day (so that the total recreational quota would not be exceeded under the International Salmon Treaty) is regarded as having been effective because the recreational quota has not been exceeded for the two years the limits have been in force and the total recreational catch is a reduction on pre-quota levels.

Other information obtained from North America is equivocal (Appendix 1). No evaluations of the cost-effectiveness of bag limits had been undertaken as far as could be determined. Views on their effectiveness ranged from generally ineffective in reducing total catch as less successful fishermen "picked up the slack", to being quite effective in reducing or containing catch. It appears that there has been only one study that attempts to dissect the bag limit effect from recruitment, natural mortality and other effects, even when there is reliable information that the total catch was limited.

#### Cost and practicability of enforcement of bag limits

There appears to be no information available on the cost of enforcement of fish bag limits. Bag limit enforcement is usually added to the range of other fisheries regulations which must be enforced. Often bag limits are imposed simultaneously with other regulations e.g. seasonal closures, so it would be difficult to distinguish the enforcement costs.

Crutchfield (pers comm.) suggests that compliance with bag limits in Washington DC has been surprisingly good; with a few tough enforcement drives at larger centres and occasional at sea checks.

In California, of the 500 to 1000 marine recreational fishing violation citations a year given by one 40' patrol boat, over half were for licence violations; few were for bag limit violations. No additional resources are applied for increased bag limit restrictions.

In British Columbia, an additional 6 enforcement officers were provided under the International Salmon Treaty to enforce sports fishery regulations which included bag limits and spot area closures; they were deployed to enforce all salmon sportfishing restrictions. Inspectors can issue on the spot tickets with penalties from \$25 to \$1000 for violations (including bag limit violations).

Management officers from California and British Columbia indicated they felt that bag limits are reasonable and effective, although they have not been formally evaluated. Researchers in British Columbia were not so optimistic.

#### A bag limit on GBR reef fish

If a bag limit is regarded as acceptable in principle, a number of questions would arise:

- i) to what should the limit apply: individual species, groups of species or all reef fish?
- ii) should the bag limit differ between areas of the GBR?
- iii) what should the daily and maximum possession limits be?
- iv) should bag limits only apply to particular reefs?
- v) should both spearfishing and line fishing be included?
- vi) should fishermen be required to retain whole fish?

These are considered below:

- (i) Species to which a bag limit should apply.  
Reef fishing is an opportunistic activity to the extent that most fish caught are retained and it is not always possible to predict the species which will be caught. It is therefore suggested that a bag limit should apply to all reef fish and should include Serannids, Lutjanids, Lethrinids, Plectorhynchids, (Nemipterids, Scarids).
- (ii) Differences between areas of the Great Barrier Reef. Records indicate that recreational fishermen at the southern end of the Great Barrier Reef catch more small fish than those fishing off Cairns. This suggests that the bag limit for each Marine Park Section should not be the same. Additionally, surveys by Ayling and Ayling (summarised in Ayling and Ayling, 1986) indicate that coral trout numbers vary in both north-south directions and east-west directions on the Great Barrier Reef, apparently largely independent of fishing pressure. A bag limit imposed on the basis of Far Northern Section trout numbers would be inappropriate in the Swains. The most recent data available on which bag limits could be based are shown in Table 3. There are apparently differences between charter boats and speedboats in catches within each Section. Available data are old and need to be updated and collected for all areas.

Table 3: Catches by 10% groupings of recreational fishermen by Section.

Explanation: e.g. the top 10% of fishermen in Capricornia catch 25% of the total Capricornia recreational fish catch.

% of Catch by	Capricornia (1)	Capricorn N/A	Central N/A	Cairns (2)	FNS N/A
top 10%	25			38	
" 20%	43			57	
" 30%	57			69	
" 50%	78			84	
Mean no. fish/angler day					
top 10%	33			17	
" 20%	24			8	
" 30%	18			6	
" 50%	12			2	
Suggested daily limit	20			10	
Suggested maximum:	40		20		

1. Deep sea clubs (charter boat)

2. Speedboat data 1979/80

iii) Daily and maximum possession limits.

In other parts of the world where bag limits are operating there is often a daily limit and for those who go on extended trips a maximum possession limit.

Charter vessels frequently make trips of 7-10 days duration, and a maximum possession limit needs to reflect this. However, if the maximum possession limit is much greater than the daily limit, the point of the exercise may be lost. Table 3 indicates suggested daily and maximum possession limits.

iv) Application of limits to particular reefs.

If the objective is to reduce the total amateur catch, the application of bag limits to specific reefs only is unlikely to achieve its purpose as bag limits will be targeted at the restricted reefs and the balance made up at non-restricted reefs.

Only applying bag limits to specific reefs also will require that all enforcement would need to be undertaken on the waters around that reef. Even if the objective is to encourage a truly 'recreational' approach to recreational fishing an overall bag limit associated with an educational program is likely to be more effective.

v) Application of bag limits to spear and line fishing.

There can be no justification for distinguishing between the two activities if the objective is to reduce the total amateur catch.

If the objective is also to discourage or encourage one of these activities, different bag limits would be applied. However, this seems undesirably discriminatory.

vi) Retention of whole fish.

To enable the determination of whether a bag limit has been exceeded, it is essential that fishermen retain whole fish or that bag limits be established for kilogram of fillets. However, to ensure distinguishing between, for example, purchased fillets and caught fillets, confining the limit to whole fish seems simplest.

Non-biological considerations on bag limits

i) Would they be most appropriately introduced by GBRMPA or by a fisheries agency?

Imposing a limit on number of particular species taken is within the GBRMPA power to recommend. It could be viewed as a "fisheries agency" matter, if it is a question of equity, but in terms of resource protection it can be regarded as an environmental matter. i.e. a GBRMPA concern. To the extent that it would be advisable to have bag limits throughout Queensland, any such limits would be most desirably imposed throughout by the Queensland Department Of Primary Industries.

In terms of costs of management it would undoubtedly be desirable to have bag limits imposed by another agency.

ii) What is their likely cost effectiveness vis a vis other management measures?

No data have been analysed for this matter. An evaluation is essential.

iii) What is the precise attitude of fishing bodies to bag limits?

Should the question of bag limits be pursued, it is essential that comment be obtained, particularly from bodies such as Australian National Sportfishing Association, Queensland Commercial Fishermen's Organisation, Queensland Sports and Recreational Fishing Council, Queensland Fish Management Authority, etc.

### Effects of bag limits

The likely calculated effect of the bag limits suggested in Table 3 is shown in Table 4. The caveats applying to the data in Table 3 apply also to this table.

Table 4: Likely effect of bag limits.

	Capricornia (1)	Capricorn	Central	Cairns (2)	FNS
Bag limit/angler/day					
Likely reduction in catch	20	N/A	N/A	10	N/A
% of total catch	12			12	

### Conclusion

While the benefits of bag limits in terms of total catch reduction appear significant on the data available, there is a need for further consideration of the following issues:

- cost effectiveness of bag limits over other options
- discussion with recreational fishing operators
- discussion with fisheries agencies
- an in-principle decision as to whether GBRMPA wishes to pursue the imposition of bag limits.

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## APPENDIX II NORTH AMERICAN INFORMATION

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From the USA and Canada the non-published information obtained was equivocal. A summary is presented below.

### East coast of USA

- few bag limits in force
- little opposition to their introduction
- marine enforcement poor
- chances of getting caught are small
- conservation ethic not well developed
- no cost-effectiveness evaluations before introduction  
(Dick Stone, NMFS; Gil Ridonski, Sport Fishing Institute)

### California

- bag limits in force over 100 years
- daunting array of bag limits  
(possession limits in place (See Appendix 2))
- bag limits are effective though no surveys have been done
- citations for violations in marine waters are about 500-1000 p.a. of which over half relate to licences
- public perception that fishing is deteriorating leads to acceptance of bag limits.
- the bag limit on kelp bass was reduced and led to "better fishing" - ie. people believe they are catching more kelp bass
- salmon bag limits in SFO Bay reduced from 3 to 2 fish when salmon catches were down; party boats were happy because they could run shorter trips (and more trips)!
- fish identification is a problem; only 75% of anglers could recognise even barracuda - how do they distinguish other fish
- an education program (posters & brochures) produced each year for regulations
- bag limits regarded as reasonable and successful
- no cost effectiveness evaluations before or after bag limit information.  
(California Fish and Game Officers).

### British Columbia

- a daunting array of bag limits in place (Appendix 3) with daily and possession limits (usually twice the daily limit), but considerable variations by area
- also an annual bag limit is in force on chinook salmon where each fish is recorded on the anglers licence with date and place of capture.
- limits on salmon firmed up in 1982 when US-Canadian international salmon treaty came into effect and a total catch assigned to recreational fishing; the recreational catch quota has not been exceeded for 2 years and halved the pre-quota catch for Strait of Georgia
- following treaty, an extra 6 enforcement officers provided for sports-fishery
- there appears to be increased escapement since bag limit etc.

- for ground fish, fish recognition is a problem
- procession limits not based on biological considerations
- only 3 letters received by Recreational Fishing Co-ordinator when bag limits imposed
- limit of 8 imposed because managers wanted to be "generous"
- no hard evidence that stocks are declining but anecdotal evidence
- most people do not catch 8 fish
- can not judge the effectiveness of the bag limit
- annual surveys in Strait of Georgia gave good catch information for salmon and groundfish
- some concern that low bag limits e.g.. salmon, lingcod become targets in themselves (Department of Fisheries and Oceans Offices).



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**APPENDIX III EXTRACTS FROM CALIFORNIA-POSSESSION LIMITS**


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**FIN FISH - GENERAL****27.56 TAKE GENERAL:**

Except as otherwise provided, there are no closed seasons, closed hours or minimum size limits on fin fish in the Pacific Ocean including all saltwater bays except that in San Francisco Bay between the Golden Gate Bridge and the Carquinez Bridge and in saltwater tributaries in the bay within the area bounded by Interstate 80 and Highways 17,101 and 37. Fin fish may not be taken between one hour after sunset to one hour before sunrise except from shore or piers.

**FIN FISH - MINIMUM SIZE LIMITS,  
BAG AND POSSESSION LIMITS AND SEASONS****27.60 LIMIT:**

(a) General: No more than 20 fin fish in combination of all species with not more than 10 of any one species, may be taken or possessed by any one person except as otherwise provided. (See Sections 27.70 through 28.62 for minimum size limits and poundage restrictions for certain species.)

(b) Within the overall bag limit of 20 fish the following special limits apply: Rockfish (rockcod) - 15 fish, all of which may be of the same species; lingcod - five fish; salmon - two fish; trout (including steelhead) taken from ocean and bays - three fish; white sea bass - three fish, except as provided in Section 28.35; sturgeon - one fish; striped bass - two fish; California halibut - five fish, except as provided in Section 28.15; Pacific halibut - two fish; marlin - one fish; garibaldi - zero fish; gulf groper - zero fish; broomtail grouper - zero fish.

(c) There is no limit on the following species: albacore, anchovy, bluefin tuna, grunion, jacksmelt, petrale sole, Pacific butterfish (pompano), queenfish, rays, sanddabs, shiner surfperch, sharks, skipjack, jack mackerel, Pacific mackerel, Pacific staghorn sculpin, starry flounder and white croaker.

**27.65 FILLETING OF FISH ON VESSELS.**

For the purpose of this section a fillet is the flesh from one side of a fish extending from the head to the tail which has been removed from the body (head, tail and backbone) in a single continuous piece. No person shall fillet on any boat or bring ashore as fillets any fish, except in accordance with the following requirements:

(a) Kelp bass, sand bass, spotted bass, ocean whitefish and all brown-skinned rockfish: All fillets shall be a minimum of 6 1/2 inches in length. Each fillet shall bear intact a one-inch square patch of skin.

(b) Barracuda: Fillets must be a minimum of 17 inches in length. Each fillet shall bear intact a one-inch square patch of silver skin.

(c) Lingcod and cabezon: Fillets must be a minimum of 12 inches in length. Each fillet shall bear intact a one-square patch of skin.

(d) White seabass: Fillets must be a minimum of 19 inches in length. Each fillet shall bear intact a one-inch square patch of silver skin.

(e) Pacific bonito: No more than 10 fillets of any length may be possessed. All bonito fillets possessed shall be considered a part of the allowable undersized tolerance of five bonito per day less than 24 inches fork length or weighing less than five pounds as provided in Section 28.32 of these regulations. All fillets shall bear intact a one-inch square patch of skin.

(f) All other species: Each fillet shall bear intact a one-inch square patch of skin. The fillets may be of any size.

(g) The provisions of this section do not apply to the taking and possession of halibut, salmon, steelhead, striped bass and sturgeon.

#### 27.70 TROUT IN THE OCEAN:

(a) Method of take: The trout must voluntarily take the bait or lure in its mouth.

(b) Limit: Three.

#### 27.75 SALMON CLOSURES:

(a) No salmon may be taken in ocean waters at the mouth of the Smith and Klamath rivers within three nautical miles north and south of a line drawn due west for three nautical miles from the center of the mouth of each of said rivers.

(b) No salmon may be taken during the months of August and September in ocean waters at the mouth of the Eel River within two nautical miles north and south of the line drawn due west for two nautical miles from the centre of the mouth of said river.

(c) No salmon may be taken during the month of August in ocean waters at the mouth of the Klamath River within six nautical miles north and south of a line drawn due west for three nautical miles from the center of the mouth of said river.

#### 27.80 SALMON:

(a) Methods of take: (1) Only by angling as defined in Section 1.05. No sinkers or weights exceeding four pounds may be used, except that a fishing line may be attached to a sinker or weight of any size if such sinker or weight is suspended by a separate line and the fishing line is released automatically by a mechanical device from the sinker or weight when any fish is hooked. See Sections 1.72, 28.65 and 28.70. (2) Only single barbless hooks may be used to take salmon in the ocean.

(b) Open Season: (1) Tomales and Humboldt bays: All year; (2) All other waters of the ocean and San Francisco Bay District from the Saturday nearest February 15 through the Sunday nearest November 15. (Note: The length of the salmon season in ocean waters is subject to change, depending upon action taken by the U.S. Secretary of Commerce. The department will notify the public of any change in the salmon regulations through the news media).

(c) Limit: Two.

(d) Minimum size: Twenty inches total length, except there is no size limit for salmon in Tomales Bay south of Hog Island.

**27.85 STRIPED BASS:**

(a) Open Season: All year.

(b) Limit: One.

(c) Minimum size: Forty inches total length.

(d) Methods of take: The Sturgeon must voluntarily take the bait or lure in its mouth. No sturgeon may be taken by trolling, snagging or by the use of firearms. Sturgeon less than legal size may not be gaffed, nor shall any person use any type of firearm to assist in landing or dispatching any sturgeon.

**27.90 STURGEON:**

(a) Open season: All year.

(b) Limit: One.

(c) Minimum size: Forty inches total length. (d) Methods of take: The sturgeon must voluntarily take the bait or lure in its mouth. No sturgeon may be taken by trolling, snagging or by the use of firearms. Sturgeon less than legal size may not be gaffed, nor shall any person use any type of firearm to assist in landing or dispatching any sturgeon.

**28.00 GRUNION, CALIFORNIA:** May be taken June 1 through March 31.

**28.05 GARIBALDI:** May not be taken or possessed.

**28.10 GIANT (BLACK) SEA BASS:**

(a) May not be taken off California. All fish taken incidental to other fishing activity shall be immediately returned to the water where taken.

(b) Limit: Two per angler per trip when fishing south of United States-Mexico border. A valid fishing permit or license from the Mexican Government constitutes proof that fish were taken legally.

**28.12 GULF GROUPER AND BROOMTAIL GROUPER:** May not be taken or possessed.

- 28.15 **HALIBUT, CALIFORNIA:**  
 (a) Limit: Five, except three in Tomales Bay and Bodega Bay easterly of a line running northeasterly from Tolmasles Point to the whistle buoy, then to the bell buoy (S.E. of Bodega Rock) then to the westerly side of Bodega Head.  
 (b) Minimum size: Twenty-two inches total length.
- 28.20 **HALIBUT, PACIFIC:**  
 (a) Season: Pacific halibut may be taken only from March 1 through October 31.  
 (b) Limit: Two.  
 (c) Minimum size: Twenty-two inches total length.
- 28.25 **BARRACUDA, CALIFORNIA:** Minimum size: Twenty-eight inches total length or seventeen inches alternate length.
- 28.27 **LINGCOD:**  
 (a) Limit: Five.  
 (b) Minimum size: Twentytwo inches total length.
- 28.30 **KELP BASS, BARRED SAND BASS AND SPOTTED SAND BASS:**  
 (a) Minimum size: Twelve inches total length or eight and one-half inches alternate length.  
 (b) Limit: Ten in any combination of species.

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APPENDIX IV BRITISH COLUMBIA BAG LIMITS (MARINE FISH)

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	Daily	Possession Annual
Flatfish (flounder & sole)	8	16
Groundfish (cod lingcod, sablefish, greenling, rockfish)		
lingcod, greenling.	3	6
rockfish & sculpins	8	8
Halibut	2	2
Perch	8	16
Salmon (plus other limits)	2-4*	8
(varies with area)		chinook 20-30
Sturgeon	1	2
Trout (varies with area)	2-4	

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